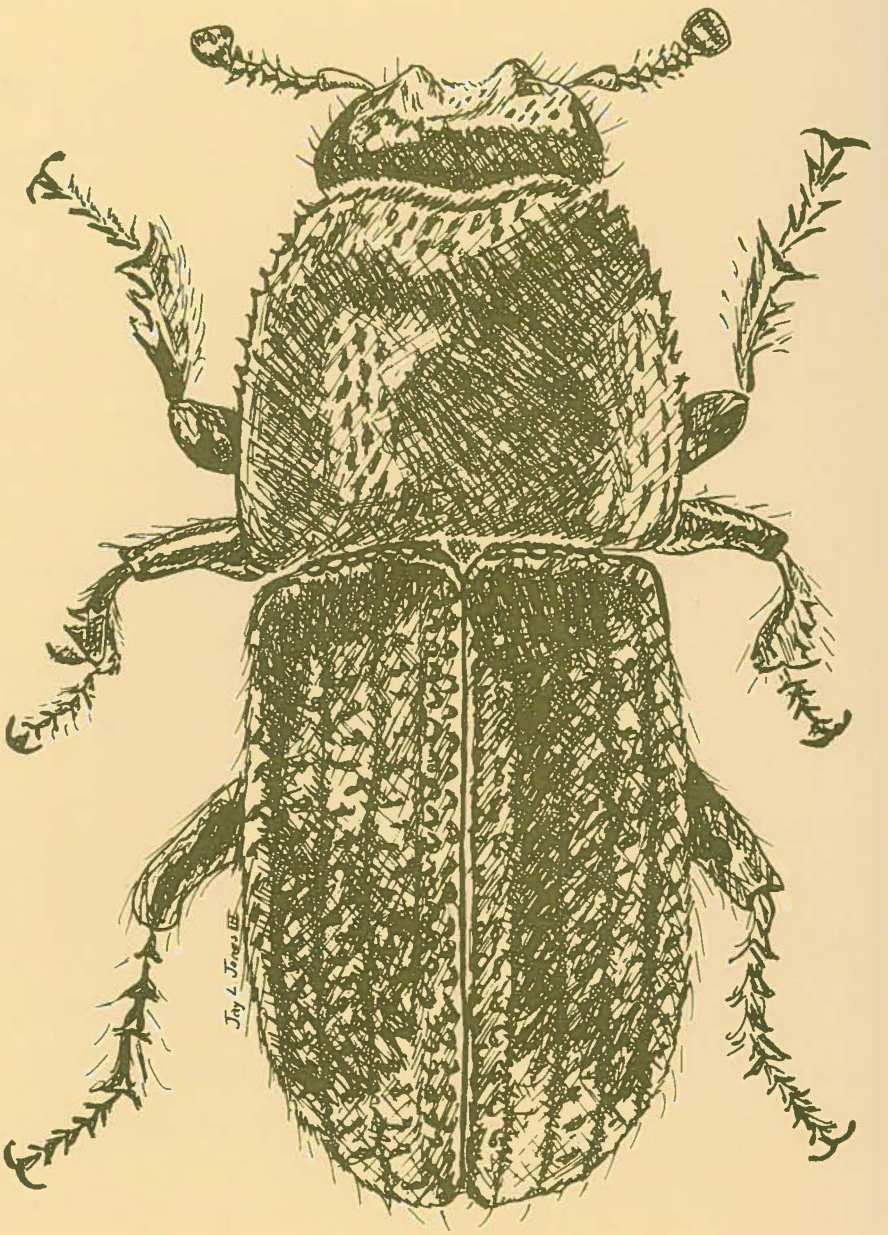
FOREST PEST ACTIVITY 1970



CIRCULAR 205

TEXAS FOREST SERVICE

FOREST PEST ACTIVITY IN TEXAS-1970

FOREST PEST CONTROL SECTION
Lufkin, Texas

Private Forest Industry
U. S. Forest Service
Texas Agricultural Extension Service
and
Texas Agricultural Experiment Station
Cooperating

TEXAS FOREST SERVICE
A Part Of
The Texas A&M University System

Forest Pest Activity in Texas-1970

Introduction

Reporting forest pest activity in Texas has evolved into an annual responsibility of the Pest Control Section of the Texas Forest Service. The report was originally conceived, at the request of the Texas Forest Pest Committee, to record the annual losses caused by forest pests and to serve as a historical record of forest pest activity in Texas.

The contents of the report are drawn from results of the activity of major forest insects and plant pathogens which have exerted an impact economically and/or aesthetically on Texas forests.

As East Texas forests contain the normal complement of plant pathogens and forest insects typically associated with Southern forests, only those pests which imparted a significant influence during 1970 are reported herein.

During 1970 insects representing three different feeding groups were of noteworthy importance: bark beetles, seed and cone insects, and defoliators.

Bark Beetles

SOUTHERN PINE BEETLE *Dendroctonus frontalis* (COLEOPTERA:SCOLYTIDAE). The southern pine beetle has, since 1957, been the most important insect pest of Texas forests. The outbreak area, which in 1957 consisted of approximately 60,000 acres in Southeast Texas, has grown to include 6.2 million acres. This area lies principally within Texas Forest Service Administrative Districts 3, 4, 5, and 6 (Figure 1).

In February 1970, the Texas Forest Service initiated monthly southern pine beetle detection flights over private land in East Texas. The flights were discontinued during the fall of the year when detection became difficult due to leaf coloration change in deciduous trees. Multiple-tree infestation areas consisting of five or more trees were recorded. Private landowners were informed of the presence of the insect on their property and instructed, where necessary, as to proper management procedure.

Figure 2 illustrates the seasonal distribution of the number of infestation spots reported for the year. As has been the case for the last four out of five years, the month of June had the greatest beetle activity, with 218 spots being detected. The actual number of infestation spots reported monthly are contained in Table 1. The total of 747 multiple-tree spots detected represents 46% of the amount of activity observed in 1969 and only 12% of the 1968 activity.

TABLE 1. Spots Detected by Aerial Observation in 1970.

Month	New Spots Detected
January	*
February	73
March	73
April	11
May	34
June	218
July	177
August	122
September	30
October	9
November	0
December	*
TOTAL	747

*No flights were made.

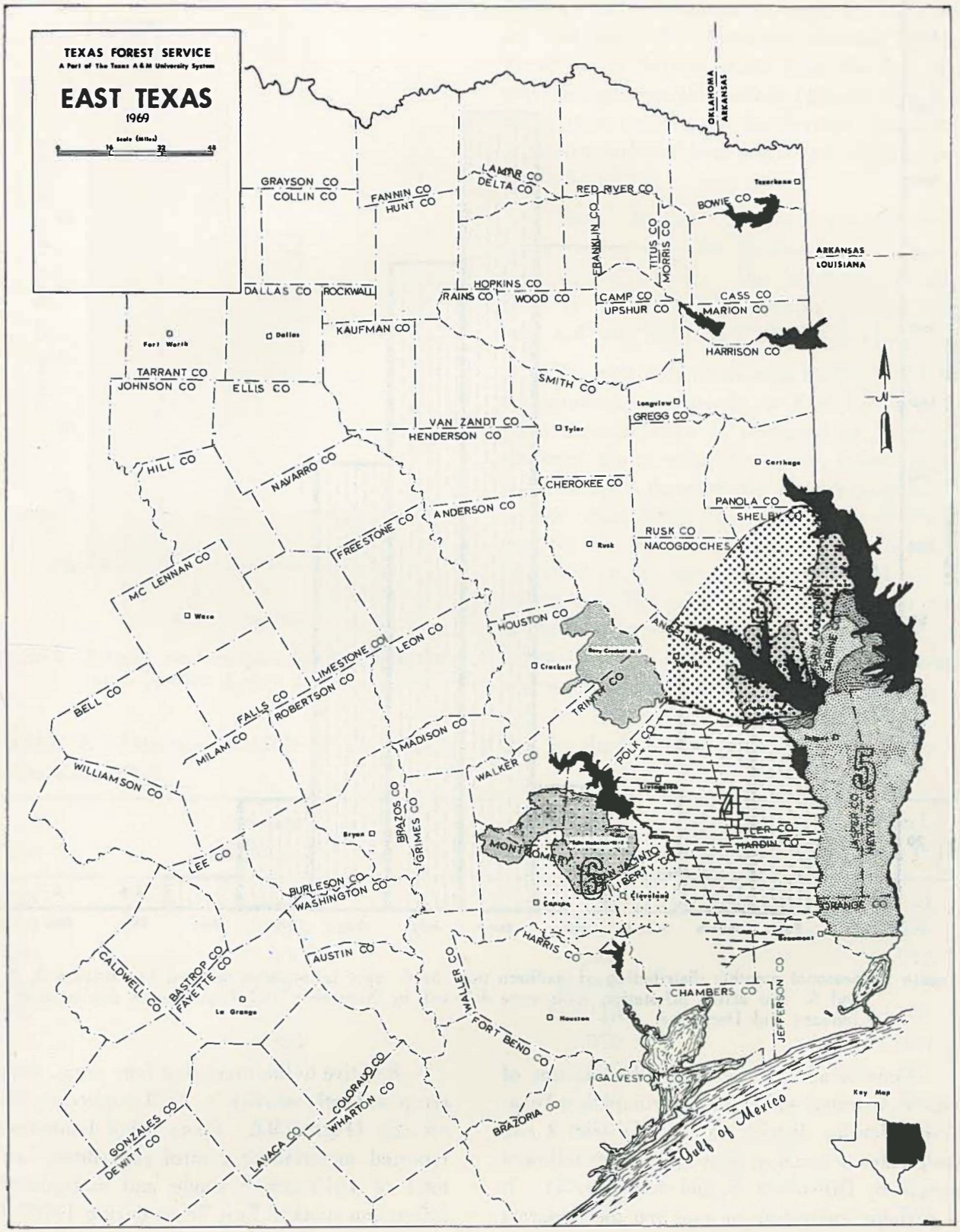


Figure 1. Texas Forest Service administrative districts in which the southern pine beetle outbreak area is approximately contained.

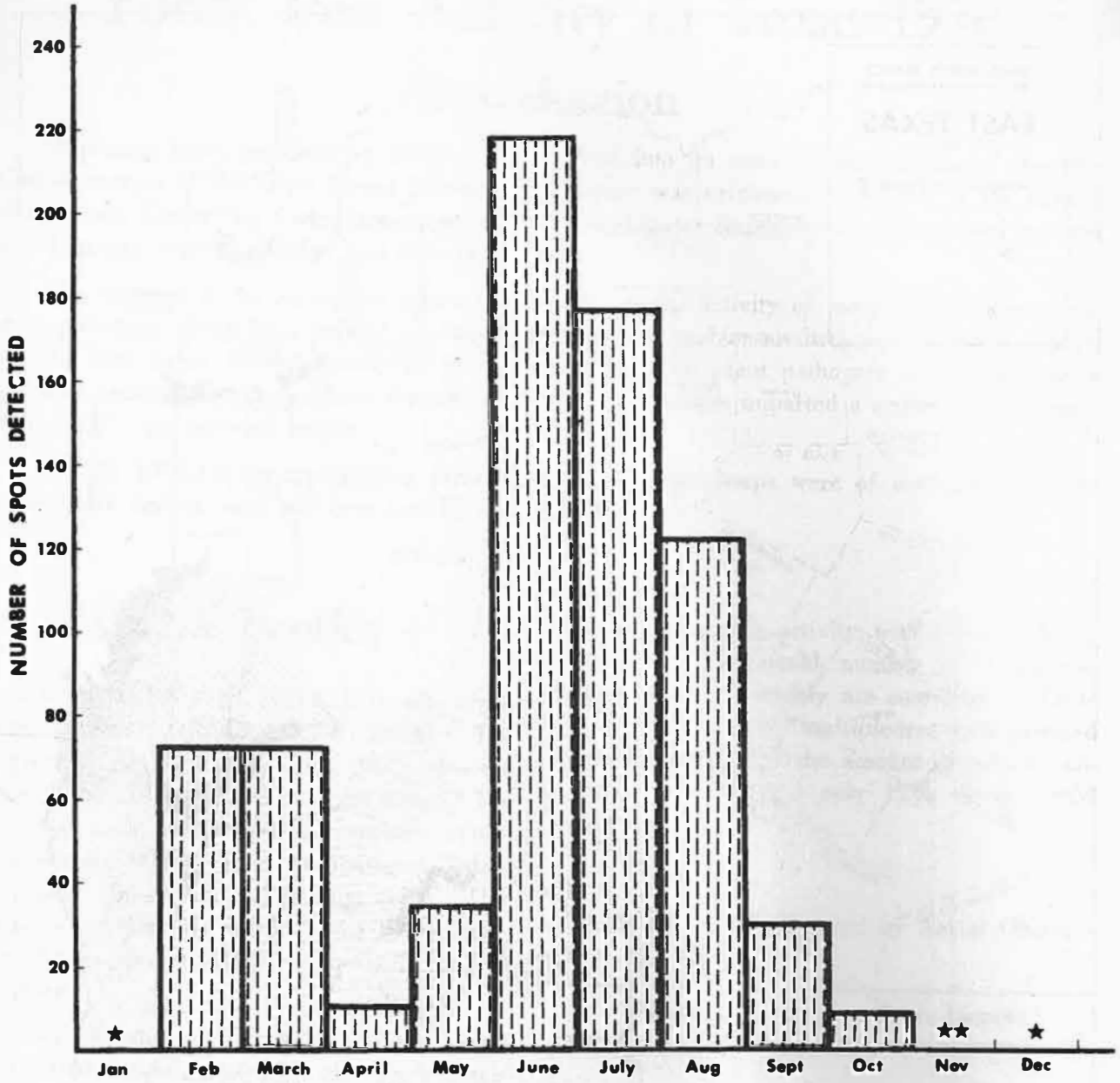


Figure 2. Seasonal monthly distribution of southern pine beetle spot infestations detected by Districts 3, 4, 5 and 6. No active infestation spots were detected in November and flights were discontinued in January and December.

Considerable variation in the amount of activity detected within each participating Texas Forest Service district existed. District 3 had the greatest amount of activity and was followed in turn by Districts 4, 5, and 6 (Figure 3). It is perhaps interesting to note that the apparent center of activity for the southern pine beetle has moved from the southern section, where the infestation was first detected, into the northern most district within the infestation zone.

Relative to the preceding four years, southern pine beetle activity in 1970 reached its lowest ebb (Figure 4). Cooperating landowners reported undertaking control procedures on a total of 1013 active single and multiple-tree infestation spots in East Texas during 1970. In all, 31,163 infested trees were salvaged, averaging 31 trees per infestation spot. Approximately 826 acres of infested timber were salvaged.

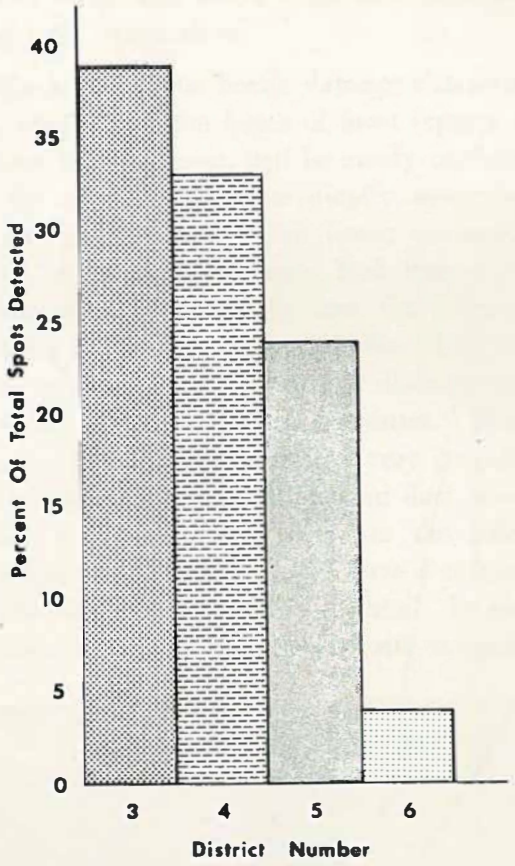


Figure 3. Relative southern pine beetle activity between Districts 3, 4, 5 and 6.

The apparent discrepancy between the 1013 active infestations managed by landowners and the 747 infestations detected by the Texas Forest Service arises from the fact that only multiple-tree infestations (greater than five trees) were reported by the Service. Landowner reports included both single and multiple-tree infestations.

During the last three years, the total acreage of timber killed by the southern pine beetle has declined greatly. The 1970 total of 826 acres is approximately one-half of the 1969 total and only one-fifth of the 1968 total.

The total volume of pine timber killed by the southern pine beetle in East Texas from 1958 through 1970 is presented in Table 2. Although the amount of activity, based on infestation spots detected was considerably lower in 1970 than 1969, the total volume of timber lost for the two years was almost identical (1760 M cu. ft. for 1969 and 1782 M cu. ft. for 1970). The volume of sawtimber lost was approximately 60% less and the volume of pulpwood lost was approximately 50% greater during 1970 than 1969.

TABLE 2. Estimated Volume of Pine Timber Killed by the Southern Pine Beetle in Southeast Texas since 1958.

Year	Sawlogs (M bd. ft.)*	Pulpwood (Cords)*	Total (M cu. ft.)*
1958	500	0	84
1959	2,500	2,500	598
1960	8,000	8,000	1,912
1961	17,887	24,000	4,715
1962	93,043	111,110	23,538
1963	4,084	1,920	820
1964	2,501	1,420	520
1965	3,797	7,743	1,192
1966	6,256	6,930	1,544
1967	7,194	8,566	1,818
1968	17,644	22,037	4,533
1969	7,341	7,478	1,760
1970	4,318	14,730	1,782
TOTAL	175,065	216,434	44,816

*Conversion factors 167 cu. ft./M bd. ft. and 72 cu. ft./cord.

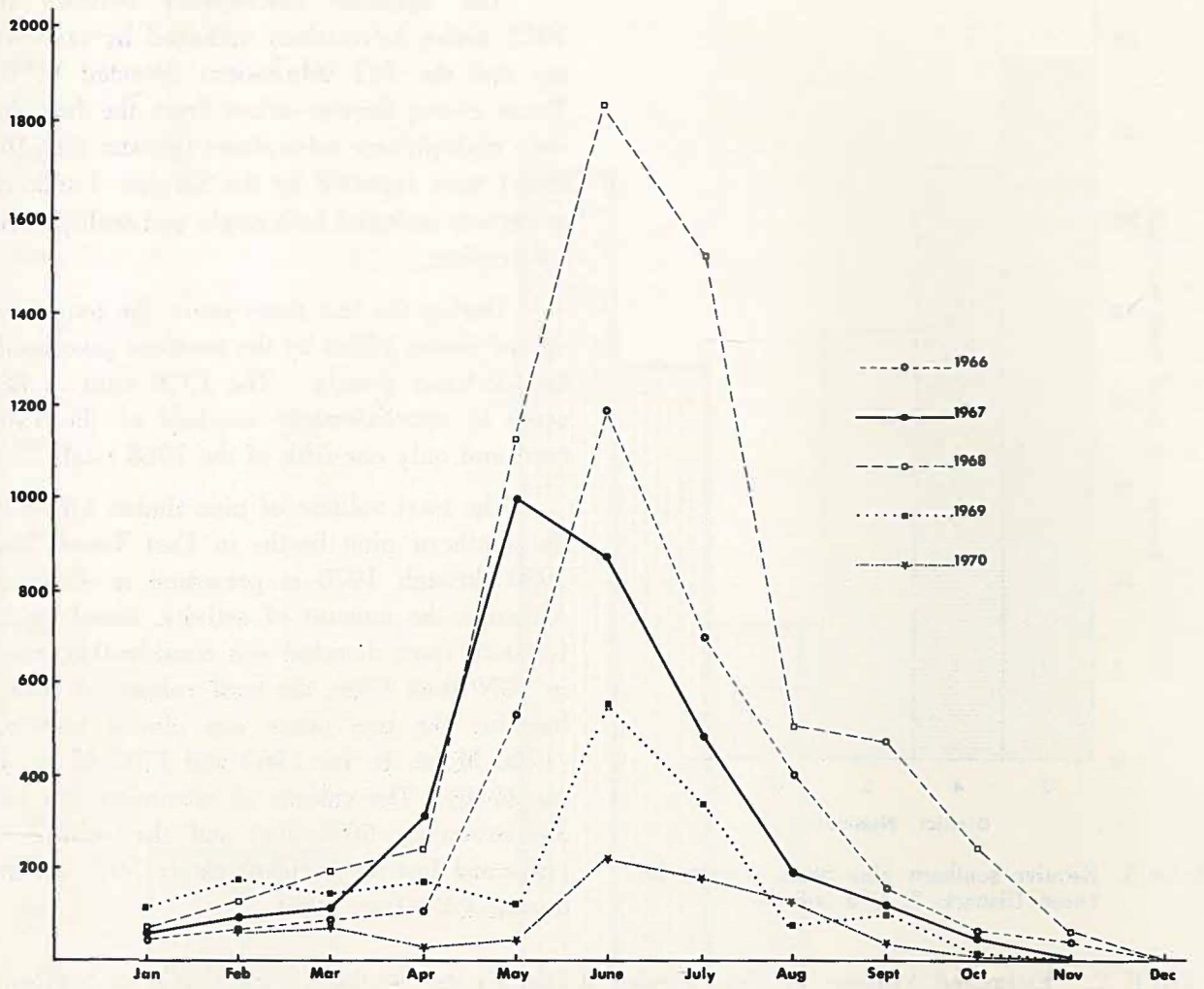


Figure 4. Newly detected southern pine beetle spots by month for 1966-1970.

Since 1958, a total of 175,065 M sq. ft. of sawtimber, 216,434 cords of pulpwood, or a grand total of 44,816 M cu. ft. of timber has been killed by the southern pine beetle in East Texas.

Management procedures for 1970 centered primarily on salvaging southern pine beetle infested timber. However, the experimental "frontalure-cacodylic acid" system, which has been developed by the Boyce Thompson Institute through the Southern Forest Research Institute, was used on a trial basis throughout the East Texas infestation area. The procedure was used in conjunction with salvage logging. All southern pine beetle infestation spots detected in 1970 were ultimately salvaged.

BLACK TURPENTINE BEETLE *Dendroctonus terebrans* and ENGRAVER BEETLES: *Ips avulsus, Ips calligraphus, Ips grandicollis* (COLEOPTERA:SCOLYTIDAE). Towards the latter part of the summer of 1970, reported incidence of black turpentine beetle and engraver beetle activity increased and supplanted southern pine beetle reports. Conditions which predispose trees to attack by black turpentine and engraver beetles are poorly understood. Trees physiologically weakened by drought, fire, windstorm, lightning strike, etc. are apparently more susceptible than healthy trees.

Reports of black turpentine beetle were primarily associated with logging operations

and with homesites, where trees were damaged during land preparation.

Black turpentine beetle damage characteristics, which form the bases of most reports of incidence of this insect, can be easily confused with the damage characteristically associated with *Dioryctria amatella*, an insect commonly observed damaging pine cones. Both insects are, however, capable of boring into the boles of pine trees and producing pitch tubes which are similar in appearance, but can be distinguished by color and texture characteristics. Black turpentine beetle pitch tubes are very granular and thoroughly mixed with boring dust which imparts a reddish-brown color to the tubes. *Dioryctria amatella* pitch tubes have a soft texture and are usually yellow or white. In most instances, probing the galleries with a pocket knife will reveal the insect and allow certain identification.

The reported incidence of engraver beetles was considerably higher in 1970 than 1969. Many of the infestation spots detected during southern pine beetle surveillance flights towards the end of the summer were subsequently identified by ground checkers to be caused by engraver beetles.

Three species of engraver beetles are responsible for damage to pine trees in Texas: *Ips avulsus*, *I. grandicollis*, and *I. calligraphus* (Figure 5). The three species can be easily separated from each other taxonomically by the presence of teeth located on the posterior section of the wing covers. *Ips avulsus* has four teeth, *I. grandicollis* has five, and *I. calligraphus* has six.

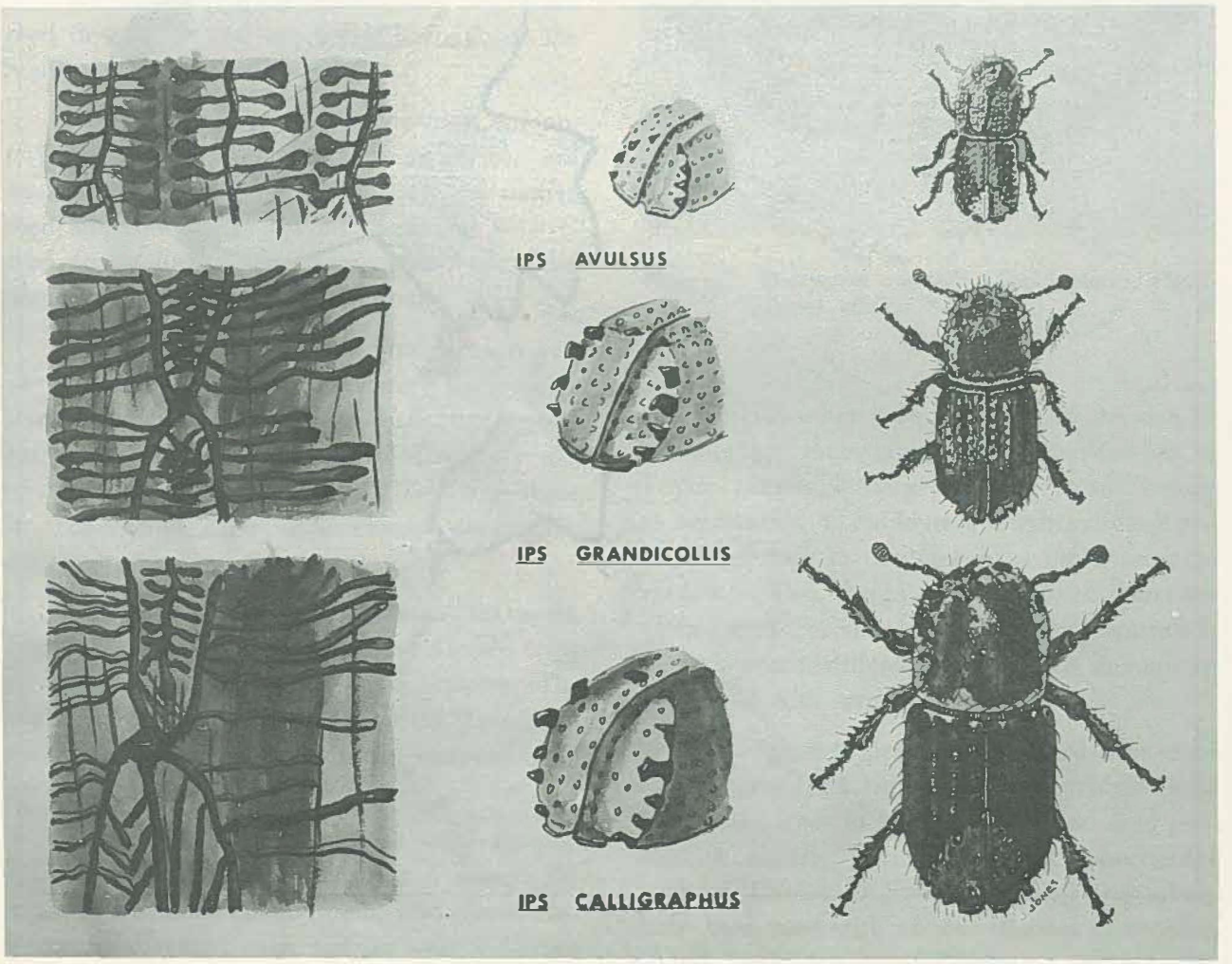


Figure 5. The three species of engraver beetles responsible for damage to pines in Texas.

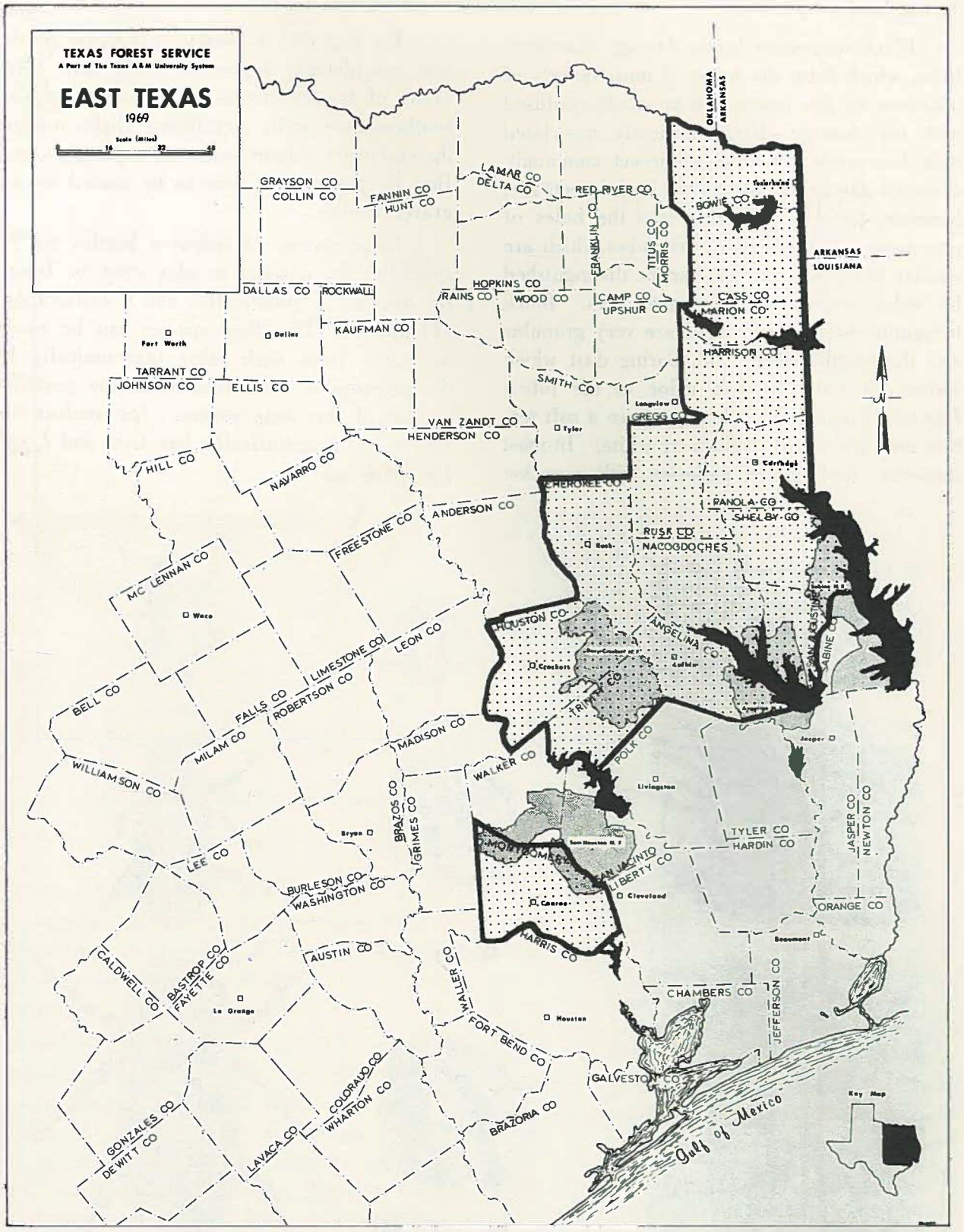


Figure 6. Area of East Texas surveyed for seed and cone destroying insects.

Management recommendations for both the engraver beetle and the black turpentine beetle were salvage logging. In cases of high value ornamental trees, the application of benzenehexachloride to the bole was recommended.

Seed and Cone Insects

In recent years, insects which damage and destroy pine cones and limit seed production have assumed a new importance. The demand for seed is increasing beyond the supply from traditional sources. Seed orchards and seed production areas have been created to provide reliable sources of high quality seed for use in reforestation programs.

Several groups of insects are important seed destroyers and are found throughout the South on all species of pine.

Insects of the genus *Dioryctria* (Lepidopteria:Phycitidae), known as coneworms, are among the most cosmopolitan and destructive seed and cone insects. Four species of *Dioryctria (amatella, zimmermani, clarioralis,* and *abietella)* are common to the South.

The Pest Control Section undertook a survey of the *Dioryctria* coneworms of loblolly pine, *Pinus taeda,* in East Texas during the summer of 1970. The intent of the survey was to determine which species of *Dioryctria* occur in Texas and their approximate geographic distribution.

Figure 6 illustrates the area surveyed. Damaged second-year cones were collected from standing loblolly pines with pole pruners. The cones were later placed in rearing containers and adult specimens of the insects were collected upon emergence.

Three species of *Dioryctria* were successfully recovered from the damaged cones: *Dioryctria amatella, zimmermani,* and *clarioralis.* Representatives of each species were collected throughout the area shown in Figure 6.

The nomenclatural status of the genus *Dioryctria* has been in a state of confusion for several years and the species names indicated above are tentative. The Pest Control Section has entered into a cooperative research program with taxonomists in the Canada Department of Agriculture to resolve the confusion relating to the scientific names applied to the various species of *Dioryctria.*

One of the most common representatives collected in the survey was *D. amatella* (Figure 7), which is very closely related taxonomically to *D. zimmermani.* The two species are often referred to as a complex.

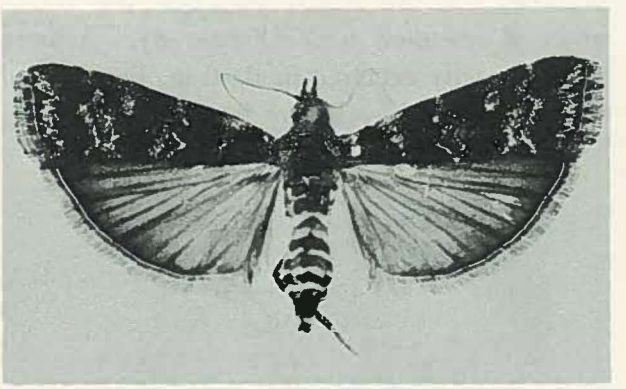


Figure 7. *Dioryctria amatella* (Lepidoptera: Phycitidae) adult.

Several other groups of insects are also of considerable importance to seed production in Texas. Insects of the genus *Laspeyresia,* known as seedworms, (Lepidoptera:Olethreutidae) are as widespread in occurrence as the *Dioryctria* species. Two bugs, *Leptoglossus corculus* (Hemiptera:Coreidae) and *Tetyra bipunctata* (Hemiptera:Scutilleridae) are also commonly associated with seed destruction.

Management practices for seed and cone insects have been limited almost exclusively to high value trees in seed orchards and seed production areas. Various systemic insecticides such as Thimet, Di-Systom, Bidrin, and others have been used with various degrees of success. Trunk implantations of Bidrin seem to give the most reproducible success in management of the insects.

Defoliators

During 1970 defoliator damage in Texas was centered primarily on activity in live oak, *Quercus virginiana*, and post oak, *Quercus stellata*.

The Pest Control Section continued a survey of live oak and post oak damage by defoliators, which was initiated in 1969.

Damage was caused by two insect species, *Archips argyrospila* and *Cenopis pettitana* (Lepidoptera:Tortricidae) and was considerably less severe in 1970 than in 1969. The 1970 outbreak was characterized by complete defoliation of scattered trees (Figure 8). Activity was primarily centered in Bastrop, Fayette and Colorado Counties (Figure 9).

Figure 8. Live oak, *Quercus virginiana*, defoliated by *Archips argyrospila* and *Cenopis pettitana* (Lepidoptera: Tortricidae).

Although live oaks in Texas are of marginal economic value as timber, the trees do provide mast for deer populations. Wildlife specialists have expressed concern over mast production being limited by insects in areas where deer herds are dependent upon live oaks for food.

The decline in activity of *A. argyrospila* and *C. pettitana* reduced the threat of limited mast supplies, however, several other species of insects also directly affect mast production by feeding on acorns.

The role of defoliators in pine and hardwood forests is sometimes underestimated, particularly with regard to deciduous trees, which are rarely killed by periodic defoliation. The loss in growth of defoliated trees, when considered over several years, has an effect on productivity which is difficult to see and measure. Nevertheless the loss is often quite sizeable. Although no management procedure has been undertaken to curtail defoliation of live oak, the level of activity observed in 1971 will dictate what measures need to be undertaken.

Future Involvement of the Pest Control Section

The activities and responsibilities of the Pest Control Section have been expanded to include a research program, oriented primarily towards upgrading the quality and efficiency of survey, detection, and management of Texas forest pests.

The recent growing concern over widespread use of pesticides in the environment demands that new and improved procedures for pest management be developed. Concurrent with the development of new procedures and the refinement of older methods must come additional information relating specifically to the pest organisms. Traditionally, innovations in pest management have come from agencies not directly involved in application.

By direct involvement in both the application of pest management practices and research on problems relating to pest management, it is believed that the Pest Control Section can better serve the forestry-related industries of Texas and the South.

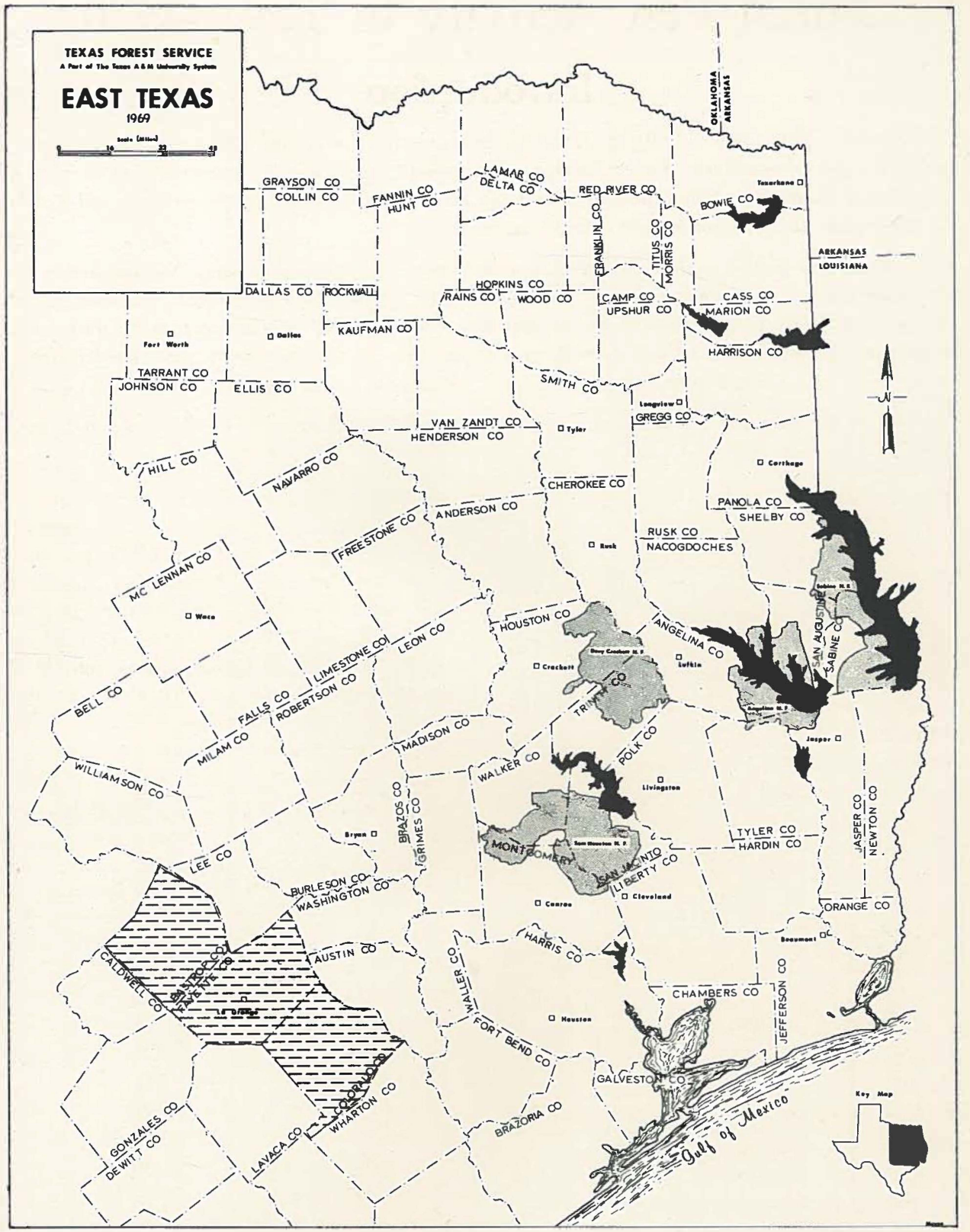


Figure 9. Area of East Texas in which defoliation of live oak and post oak was reported.